A SYSTEM AND METHOD FOR COMPUTING LOW COMPLEXITY ALGEBRAIC NETWORK CODES FOR A MULTICAST NETWORK

ABSTRACT OF THE INVENTION

A "multicast code constructor" facilitates network based coding in a multicast environment by determining efficient codes for optimizing network flows, thereby increasing reliable network throughput. The network code constructor processes incoming data at each node on a byte-by-byte level to produce outgoing packets to each node in the network. Network coding is provided in which arithmetic operations can occur in any finite field with more than $N-1$ elements, where N represents the number of receivers in the network. Further, the complexity of arithmetic employed by the coder is independent of the network capacity, and dependent only on the number of receivers in the network. In addition, in one embodiment, multicast codes are restricted to the portion of the network obtained by a union of unicast flows from a sender node to each receiver node to produce codes which do not flood the network excessively, thereby producing a lower code design complexity.